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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/767,854	01/30/2004	Soon Hyung Hong	2236.0070000/JUK/SMW	2978
26111 7590 08/11/2008 STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C. 1100 NEW YORK AVENUE, N.W. WASHINGTON, DC 20005				
EXAMINER				
BAREFORD, KATHERINE A				
ART UNIT		PAPER NUMBER		
1792				
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08/11/2008		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/767,854

**Applicant(s)**

HONG ET AL.

**Examiner**

Katherine A. Bareford

**Art Unit**

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 June 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1, 4, 6 and 7 is/are pending in the application.
- 4a) Of the above claim(s) 7 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 4 and 6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/CDC)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date \_\_\_\_\_

**Detailed Action**

1. The amendment of June 11, 2008 has been received and entered. With the entry of the amendment, claims 2, 3, 5 and 8 have been canceled, claim 7 is withdrawn from consideration, and claims 1, 4 and 6 are pending for examination.

***Election/Restrictions***

2. Claim 7 remains withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on October 25, 2007.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 4 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Galasso et al. (patent number 4,425,407, hereafter Galasso '407) in view of Booth et al. (Patent number 5,330,789, hereinafter Booth '789), Holko (U.S. Patent number 5,021,107, hereafter Holko '107) and Hanzawa et al (US 2001/0051258, hereinafter Hanzawa '258).

With respect to claims 1 and 4: Galasso '407 teach a method of making an oxidation protective multiple coating for a carbon/carbon composite [col 2, lines 56-58], the method comprising: (a) forming an initial coating layer [col 2, lines 67-68] on the carbon/carbon composite by a pack cementation process [col 2, lines 64-67]; which develop a thin layer of SiC on the surface. Further, the pack produces vapor of silicon and /or decomposable silicon compounds [col3, lines 1-3]. After the silicon carbide coating is applied, other coating such as Si powder can be applied [col 3, lines 53-57]. Galasso '407 also teaches, as to steps (a) and (b) as claimed, that the carbon-carbon article may be embedded in powder mixture containing silicon and pack then the article is heated to about 1600°C [col 3, lines 2-6] during which time a silicon carbide conversion layer is produced [col 3, lines 6-8].

Galasso '407 does not teach as to claimed step (a) that the powder is applied by spraying on a mixture of Si and volatile liquid and drying to remove the vehicle liquid; in addition Galasso '407 does not teach part of claimed step (b) of producing Si-SiC layer, nor claimed step (c) of oxidizing Si in the Si-SiC layer;

With respect to claimed step (a): Holko '107 teach the use of a volatile carrier such as alcohol [col 5, lines 18-19] in a mixture (slurry) with powder in order to applying powders of interlayer materials which may be Si [col 3, lines 61-64] by a method such as spraying [col. 5, lines 15-25]. It would have been obvious to one of ordinary skill in the art at the time of the invention to have used spraying with an alcohol as a liquid vehicle for coating the Si powder to the coated carbon/carbon

composite with reasonable expectation of success because Holko '107 teaches that it is a suitable method. The further heating steps discussed by Galasso '407 and below would provide drying.

With respect to claimed steps (b) and (c): Booth '789 teaches features of claimed step (b) and step (c) in a method which provide a protective coating on carbon substrate and the method comprises contacting a surface of the carbon substrate with silicon particulate and silicon carbide then heating to a suitable temperature, which produces a coating of SiC and Si [col 2, lines 65-69-col 3, lines 1-2, col 4, lines 30-35]. Booth '789 further teaches that the formation of SiO<sub>2</sub> to protect the SiC and Si layer is desirable, and that it forms at 1600 degrees F (871 degrees C) or greater by oxidation of the coating [col 4, lines 30-40]. Booth '789 further teaches that a desirable SiO<sub>2</sub> layer can be formed on the article by providing a further layer with Si particles, SiC particles and boron particulates, and heating this to form SiO<sub>2</sub> (along with boron oxides) [col 4, line 55 through col 5, line 40]. This further oxidation occurs at 900-1600 degrees F (482-871 degrees C) [col 5, lines 30-40]. It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Galasso '407 to add a protective coating of SiO<sub>2</sub> to the surface of the formed articles as suggested by Booth '789 to provide a desirable protective coating, because Galasso '407 provides a coating with Si, SiC and Booth '789 teaches that such coatings are desirably protected with SiO<sub>2</sub>. As to the heat treating at the claimed temperature and pressure to impregnate the composite with the Si, thereby forming an SiC layer and an Si layer, Galasso '407 teaches heat treating

Si/SiC material at 1500-1700 degrees C, such as 1600 degrees C to impregnate (diffuse) coating into the composite [col 3, lines 1-10, 60-68], and Booth '789 teaches heating to a final temperature of 2900 – 3000 degrees F (1592-1648 degrees C) to provide an Si/SiC coating [col 4, lines 1-10]. Hanzawa '258 provides that Si material can be heated at a final temperature of 1450-2500 degrees C at 0.1 to 10 hPa (75 - 7500 mTorr) to melt the silicon to impregnate the carbon/carbon composite to form Si/SiC [par. [0068], [0071]]. Hanzawa '258 provides a specific embodiment where the carbon/carbon composite is impregnated with Si powder at a final temperature 1600 degrees C and a pressure of 1hPa (750 mTorr) [par. [0112]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide that the heating and pressure are at 1600 degrees C and 750 mTorr (within the claimed range) as described by Hanzawa '258 in order to provide a desired impregnating of the Si containing material into the carbon/carbon composite as Galasso '407 and Booth '789 teach impregnation at overlapping temperatures to that of Hanzawa '258 and Hanzawa '258 teaches desirable pressure conditions as well for impregnation of Si containing material into a carbon/carbon composite. This would provide the SiC and Si layers, as this is a direct result of the heat treatment as claimed. The Examiner notes that Hanzawa '258 also notes the formed gradient of SiC materials, then Si materials (par. [0029], [0033]).

Claim 6: as to the oxidation at a temperature of between 400-800 degrees C, Booth '789 teaches that such desirable oxidation can occur at a temperature between 900 and 1600 degrees F (482-871 degrees C) by providing an Si containing layer that

Art Unit: 1792

contains Si, SiC and also boron particulates, and therefore one of ordinary skill in the art at the time the invention was made would be suggested to provide such boron particulates in the mixture to provide a lowered temperature of oxidation. As to the exact temperature of oxidation, Booth '789 provides an overlapping range of temperature, and In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976).

### *Double Patenting*

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6. Claims 1, 4 and 6 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 4 and 6 of copending Application No. 10767858 (hereafter '858) in view of Galasso et al. (Patent number 4,425,407, hereafter Galasso '407).

'858 claims all the features of the current claims and also forming an initial coating layer by pack cementation process. Galasso '407 teaches forming an initial coating layer [col 2, lines 67-68] on the carbon/carbon composite by a pack cementation process [col 2, lines 64- 67] to improve adhesion. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed an initial coating layer by pack cementation on the process of '854 as well as '858 because Galasso '407 teaches that it is a suitable process for a better adhesion.

This is a provisional obviousness-type double patenting rejection.

#### ***Response to Amendment***

7. The declaration under 37 CFR 1.132 filed June 11, 2008 is insufficient to overcome the rejection of claims 1, 4 and 6 based upon the 35 USC 103(a) rejection as set forth above because (1) MPEP 715.04 (II) indicates that when a declaration is used in place of an affidavit, "The declaration must include an acknowledgment by the declarant that willful false statements and the like are punishable by fine or imprisonment, or both (18 U.S.C. 1001) and may jeopardize the validity of the application or any patent issuing thereon. The declarant must set forth in the body of the declaration that all statements



made of the declarant's own knowledge are true and that all statements made on information and belief are believed to be true." Here, the declaration provides paragraph 13, which states that "I have read and understand 37 C.F.R. § 10.18(b) and (c)." This does not meet the requirements of MPEP 715.04, because the declarant has not "set forth in the body of the declaration that all statements made of the declarant's own knowledge are true and that all statements made on information and belief are believed to be true" (emphasis added). Therefore, the declaration cannot be given weight, as it is in improper form. (2) Furthermore, even if the declaration was considered, it would not overcome the above rejection. As to the upper temperature limit of 1600 degrees C, this is indicated as cost minimizing, however, there is no indication that this is an unexpected benefit. As to the lower temperature limit of 1400 degrees C, the declaration indicates that the temperature should be above melting (above 1412 degrees C), which is actually above the bottom limit of applicant. Hanzawa '258 also provides a bottom limit of 1450 for the melt silicon step, so it too provides a temperature above the melting of silicon [par. [0068]]. Moreover, Hanzawa '258 provides an example within the claimed range -- 1600 degrees C [para [0112]], which provides directions to use a temperature in the claimed range. While Hanzawa '258 and Booth '789 provide first heating steps before the heating in the claimed ranges, this is not prevented by the claims as worded.

***Response to Arguments***

8. Applicant's arguments filed June 11, 2008 have been fully considered but they are not persuasive.

As to the 35 USC 103 rejection, the Examiner notes that Hanzawa '258 has been provided in the rejection of claims 1, 4 and 6, as the features of claim 5 which Hanzawa was previously provided to reject have now been provided in claim 1. Applicant has further argued that the cited references do not teach oxidizing the Si layer to form SiO<sub>2</sub>. The Examiner disagrees, as Booth '789 clearly provides the desire to oxidize an Si containing layer to provide SiO<sub>2</sub>, with the reference noting that the first layer would be desirably oxidized but that a high temperature is needed, and that the second layer, with contains Si is to be oxidized as well, at the lower temperature. As worded, the claims do not require the Si layer to contain nothing but Si. As to the temperature/pressure of claim 5, now in claim 1, the discussion as to the declaration in the *Response to Amendment* section is maintained. Furthermore, as to the anticipation of the temperature, the Examiner notes again that in para. [0112], Hanzawa '258 provides an example of 1600 degrees C, within the claimed range.

As to the provisional obviousness-type double patenting rejection, applicant argues that because the present case and 10/767,858 have the same effective filing date, the present double patenting rejection is improper. The Examiner disagrees. See MPEP 804.02 (VI) "Accordingly, a terminal disclaimer under 37 CFR 1.321 is required in an

application to overcome a **>nonstatutory<** double patenting rejection, even if the application was filed on or after June 8, 1995 and claims the benefit under 35 U.S.C. 120, 121, or 365(c) of the filing date of the patent or application which forms the basis for the rejection.” (emphasis added). Even if the other application has the same filing date, the obviousness-type double patenting rejection is proper. Therefore, the provisional obviousness-type double patenting rejection is maintained.

### *Conclusion*

9. Please note the new Examiner on this case.
10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date

of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:00-3:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy H. Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Katherine A. Bareford/  
Primary Examiner, Art Unit 1792